

# UEMS European Training Requirements

## 1. Preamble

The Union of European Medical Specialists (UEMS) is a non-governmental organisation representing national associations of medical specialists at the European Level. With a current membership of 34 national associations and operating through 41 Specialist Sections and European Boards, the UEMS is committed to promote the free movement of medical specialists across Europe while ensuring the highest level of training which is required to optimise the of quality of care for the benefit of all European citizens. The UEMS areas of expertise include Continuing Medical Education, Post Graduate Training and Quality Assurance.

It is the UEMS's conviction that the quality of medical care and expertise is directly linked to the quality of training provided to medical professionals. Therefore, the UEMS is committed to improve medical training through the development of European Standards in the different medical disciplines. No matter where doctors are trained, they should have at least the same core competencies.

In 1994, the UEMS adopted its Charter on Post Graduate Training to provide recommendations for good medical training. Its six chapters set the basis for the European approach to Post Graduate Training. Five chapters are common to all specialties, with a sixth chapter completed by each Specialist Section according to the specific needs of their discipline.

Over 25 years after the introduction of this Charter, the UEMS Specialist Sections and European Boards continue developing European Standards in medical training that reflect modern medical practice and current scientific knowledge. In doing so, the UEMS Specialist Sections and European Boards do not aim to supersede the National Authorities' competence in defining the content of postgraduate training in their own State, but rather to complement these and ensure that high quality training is provided across Europe.

At the European level, the legal mechanism ensuring the free movement of doctors through the recognition of their qualifications was established in the 1970s by the European Union Sectorial Directives, with one Directive specifically addressing medical Training. However, in 2005, the European Commission proposed a unique legal framework for the recognition of the Professional Qualifications to facilitate and improve the mobility of all workers throughout Europe. This Directive, 2005/36/EC, established the mechanism of automatic mutual recognition of qualifications for medical doctors according to training requirements within all Member States, based on the duration of training in the Specialty and the title of the qualification.

Given the long-standing experience of UEMS Specialist Sections and European Boards, and the European legal framework enabling Medical Specialists and Trainees to move from one country to another on the other, the UEMS is uniquely positioned to provide specialty-based recommendations. The UEMS values professional competence as "the habitual and

judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served” (Epstein and Hundert, 2002). While professional activity is regulated by national law in EU Member States, it must comply with International treaties and UN declarations on Human Rights as well as the World Medical Association International Code of Medical Ethics.

This document derives from the previous Chapter 6 of the Training Charter and provides definitions of specialist competencies as well as how to document and assess them. It provides the basic Training Requirements and should be regularly updated by UEMS Specialist Sections and European Boards to reflect scientific and medical progress.

## 2. Cardiology background

The objectives of the UEMS-CS and ESC include the progressive harmonisation of the content and quality of training in cardiology within the member states of the European Union (EU) and other European countries. To this end the UEMS-CS will continue to cooperate with the European Society of Cardiology (ESC) and the individual national cardiology societies and professional bodies to define the training requirements for the specialty of cardiology. This will include the contents of training, the assessment of competence and an outline of the desirable context for training – the requirements of trainees, trainers and training institutions.

This process of standardisation and harmonization of cardiology training runs in parallel with European developments in the certification, recertification, continuing medical education (CME) and continuing professional development (CPD) of cardiologists.

It is accepted that there is a prevailing trend for increased sub-specialization in cardiology, and this is supported by both UEMS-CS and ESC whenever it is consistent with improved standards of clinical practice. However, in order to meet the needs of patients and the wide variety of models of service provision across Europe, it is essential that all cardiologists obtain broad based training across all of cardiology, irrespective of any further sub-specialisation, and it is this training in cardiology that is defined here.

## 3. Cardiology training aims

The training requirements for the specialty of Cardiology aim to produce a competent specialist cardiologist. A cardiologist, a sub-specialisation of a physician, predominantly cares for patients with cardiovascular disorders and the concepts of Cardiology and Cardiovascular Medicine can be used interchangeably. Care of patients with cardiovascular disorders embraces a wide range of emergency and elective clinical activities. Cardiologists need knowledge of not only the underlying disease processes, available diagnostic and therapeutic modalities but also an appreciation of the importance of the epidemiology and potential for the prevention of cardiovascular disease. Cardiologists require a broad understanding of the cardiovascular needs of individual patients and the communities in which they live. In order to provide optimal patient care, cardiologists need the ability to work as members or leaders of teams and systems involving other healthcare professionals.

Cardiologists, who work as hospital-based specialists or in the community, need to integrate their work with community based primary care colleagues and also other hospital-based physicians, anaesthetists and imaging specialists including radiologists and nuclear medicine specialists. Cardiologists have a wide variety of opportunities for research and their training is designed to facilitate opportunities for academic careers.

## 4. Training requirements

Training in cardiology places responsibilities on trainees, but also on their trainers and training programmes. While it is important for training to be individualised, there are core principles which are essential to train cardiologists who are able to deliver the care required by our population.

### 4.1. Requirements of cardiology trainees

Cardiology trainees must be physicians licensed to practice and fulfil all legal and regulatory requirements in their country of training. They must have successfully completed general professional training with an extensive knowledge of the acute and chronic presentations of a broad range of medical and surgical conditions, acquired through active participation in patient care.

All trainees must have the necessary linguistic abilities to communicate complex information effectively with patients and colleagues. They must always act honestly and in their patients' best interests, in accordance with national and international guidance on human rights and medical ethics.

Cardiology is a rapidly evolving medical specialty and trainees must equip themselves to be life-long adult learners. They must engage fully with the requirements of their curriculum and training programme, including the supervised delivery of clinical care, taking part in teaching and training opportunities, and the preparation for required assessments. Trainees should provide formal and informal feedback on their training. They have a responsibility to raise any causes for concern about patient safety, their training or the training of their colleagues to their supervisors in accordance with national laws and regulations.

### 4.2. Requirements of cardiology trainers

The delivery of high-quality training requires highly skilled trainers with the necessary time to deliver a structured programme covering the cardiology core curriculum and to undertake the assessments required to ensure that trainees have satisfactorily completed their training. Trainers should be experienced cardiologists undertaking clinical practice, they should undergo specific training and continuing professional development in educational supervision and assessment, and their role should be recognised by national training authorities.

Trainers must have a good working knowledge of the core curriculum, including their responsibilities for teaching, supervision and assessment. All aspects of training must be appropriately supervised and assessed. The level of this supervision must be appropriate for the documented competence of the trainee and the clinical situation, it must also routinely include the opportunity to personally discuss all cases. As training progresses, the trainee

should have the opportunity for increasing autonomy, consistent with safe and effective patient care.

#### 4.3. Requirements of cardiology training programmes

Cardiology training programmes, organised at a national or regional level, are responsible for the selection of an appropriate number of trainees and the delivery of post-graduate training and assessment in a supportive learning environment. All programmes must provide structured education to enable trainees to acquire the knowledge, skills, and attitudes to complete the competencies detailed in the Entrustable Professional Activities included in the core curriculum. Post-graduate training in Cardiology must be at least 5 years – including training in Medicine or Medical subspecialties, which precede full-time cardiology training (Figure 5). Trainees should have the opportunity to receive part of their training in recognised training institutions in other member states of the EU or elsewhere. These training periods must be approved in advance by the relevant training authority. Training programmes should make reasonable adjustments to accommodate the needs of trainees with disabilities and those wishing to undertake less than full-time training.

A national authority should determine each country's process for the selection and appointment of trainees in cardiology. This should be regulated in accordance with national workforce planning projections. The process should be based on merit, transparent, objective, and open to all doctors who have completed basic medical training.

A national cardiology training committee should oversee all training programmes and provide external support when required. Each training programme should have a director who is an experienced trainer, supported by the educational and clinical supervisors in the training institutions. The director has overall responsibility for a training programme, coordinating placements within and outside the programme, attendance at courses and congresses, overseeing structured learning, and investigating concerns expressed by trainees or trainers. The duration of the training programme and the trainees' working patterns must comply with all applicable EU directives and national laws.

All trainees should have a named educational supervisor who is selected and appropriately trained to be responsible for the overall supervision and management of their educational progress during a placement or series of placements. They should also have a range of clinical supervisors who are trainers selected and appropriately trained to be responsible for overseeing the trainee's clinical work and providing constructive feedback during a training placement.

Supervisors should have formal documented meetings with their trainees at least every 3 months. Activity, progress, assessments, individual strengths and weaknesses should be discussed and recorded in an agreed summary. The educational supervisor should issue a formal report on progress at the end of each year of training and when there is a change of supervisor, which is shared with the trainee and the training director. Progress against the core curriculum should be assessed regularly based on the required EPAs. At the end of the training programme, each trainee will be assessed according to the independence levels documented in the EPAs. This will document the competences achieved and whether the core curriculum has been completed satisfactorily.

#### 4.4. Requirements of Training institutions

Training may be delivered within a single institution but, more commonly, trainees may rotate between centres to acquire a full range of competencies. All training institutions should be nationally recognised and must provide a supportive learning environment including appropriate supervision, learning materials, dedicated time for learning and structured assessments. There should be an appropriate number of fully trained cardiologists in each training institution to provide the educational and clinical supervision required by their trainees.

Each centre should undergo structured monitoring by the relevant authority including surveys and external evaluation of training and assessment at least every five years. Each centre should have an internal system of clinical audit and quality assurance including structured reporting of adverse or near miss events, morbidity and mortality meetings, and audits against national and international standards.

It is recognised that the case-mix and numbers of patients, investigations, procedures, and research opportunities will vary between centres. It is essential that programmes provide the full range of learning opportunities to all trainees over the duration of their training.

Training institutions should have a library and internet facilities offering access to the current world scientific literature, including major international cardiology and internal medicine journals, and should provide the necessary physical infrastructure for trainees including conference rooms and allocated office space with computer access.

In order to provide appropriate clinical experience, training institutions should have fully equipped facilities for treating out-patients, emergencies and in-patients including a coronary care unit with electrocardiographic and haemodynamic monitoring. There should be on-site facilities for non-invasive diagnostic and therapeutic procedures including plain X-ray, electrocardiogram, exercise and pharmacological stress testing, cardiopulmonary exercise testing, ambulatory ECG monitoring, echocardiography, and programming of implanted pacemakers and cardiac defibrillators, temporary pacing, cardioversion, and defibrillation.

During their training programme, trainees must also receive appropriate training in cardiac magnetic resonance imaging, cardiac computed tomography, nuclear cardiology, transoesophageal echocardiography, invasive coronary angiography, right and left heart catheterisation and therapeutic procedures with exposure to cardiac surgery, a cardiothoracic intensive therapy unit with assisted ventilation, ultra-filtration, and haemodynamic support devices, and the wider Heart Team.

To gain sufficient experience, trainees should be involved in the clinical management of a large number of patients with a wide range of conditions including in-patients, new and review out-patients at least once each week, patients on the coronary care unit and provide cardiac consultations for other departments. Trainees should have a regular on-call commitment for cardiology throughout the programme, not only for general internal medicine or unselected medical emergencies. They should have at least 2 hours each day for structured learning overseen by their supervisor, which may include explicit learning

such as journal clubs, methodology of research and statistics, postgraduate teaching, training in communication skills, exercises in evidence-based medicine, discussion of guidelines for clinical practice; and implicit learning embedded in clinical work such as ward rounds, case-based discussions, or the supervised acquisition of diagnostic and therapeutic skills.

Research is fundamental to the practice of cardiology, as described in the CanMEDS framework (<http://canmeds.royalcollege.ca/en/tools>) in the role of a cardiologist as a “scholar”. Trainees must acquire the skills to critically evaluate new research and its implications for clinical practice. They should also acquire a detailed understanding of the design and conduct of basic, translational, clinical and epidemiological research either in their training institution or in collaboration with other centres or universities. Training programmes should provide sufficient flexibility to allow periods of full-time or part-time research with appropriate adjustment of the total training time.

## 5. Learning opportunities

Training in cardiology requires a broad exposure to many different types of clinical learning in order to acquire the knowledge, skills, and attitudes required of a cardiologist. It is important that trainees and trainers recognise training opportunities and take the time to develop clinical skills and understanding.

### 5.1. Knowledge

Personal study is essential to supplement and extend clinical learning. This includes reading textbooks, guidelines and journals, writing reviews and other teaching materials, computer-based learning including ESC e-Learning platform, practicing and writing examination questions. Trainees should attend local, national and international cardiology educational events to see the latest research, hear key opinion leaders and meet their peers and trainers from other programmes. Learning in small groups led by a supervisor facilitates discussion and understanding of complex clinical problems. Cardiology trainees should take part in case presentations, small group discussions, presentations at clinical and academic meetings, critical incident analysis, bedside teaching, small group sessions of data interpretation, participation in audit meetings, journal clubs and research presentations. Trainees must acquire a thorough understanding of the rationale and methodology of audit and undertake a minimum of one in-depth audit every two-years of training. This should include review of guidance with recommendations for revision where indicated.

### 5.2. Skills

Although clinical training requires structured teaching, it is important to recognise that all patient interactions, whether personal or observed, are opportunities for clinical learning which can be enhanced by following the patient through the course of their illness and critical reading about clinical problems. Trainees should have the opportunity to assess both new and follow-up outpatients and to discuss each case with their supervisor to allow feedback on diagnostic reasoning and planning investigations. Ward rounds should include discussion and feed-back on clinical and decision-making skills. Trainees should also take part in multi-disciplinary meetings which are excellent opportunities to discuss clinical problems with clinicians in other disciplines. Undertaking supervised practical procedures,

including the care and counselling of patients and carers before and after the procedure, is essential to gain competence in these aspects of the curriculum. Role play with advances in the methodology of simulation training and technology, facilitate task and team training in a safe environment. As trainees gain experience, they progress from observing to performing and from simple to more complex cases. Trainees should maintain a logbook of all practical procedures. [Table 4]

### 5.3. Attitudes

The attitudes and behaviours required of a cardiologist must be developed throughout training by interactions with patients in a variety of clinical settings, and the wider clinical team including medical, nursing and other health professional colleagues within cardiology and from other disciplines. Trainees should learn from their trainers and their peers to provide the best possible care for their patients.

## 6. Assessment

Meaningful assessment is a requirement of any training programme and must be closely aligned to the curriculum. [Table 1] Cardiologists are required to perform a wide range of clinical and procedural tasks independently. These tasks are Entrustable Professional Activities (EPAs) which include knowledge, skills and attitudes [Figure 3]. Trainees must document frequent workplace-based assessments throughout training to allow them to gather evidence of competence, receive feedback and continually gain autonomy in their professional practice. [Figure 4]

The aims of EPA-based assessment are to:

- focus learning by providing clarity on training requirements
- enhance learning by providing formative feedback on performance
- assess trainees' actual performance in the workplace
- ensure trainees are acquiring competencies at an appropriate rate
- identify any requirements for targeted or additional training
- provide evidence for decisions on progression through the training programme
- provide objective, summative evidence that trainees have met the curriculum standards during the training programme

A wide range of tools is available to assess progress in the levels of independence [Table 2] required for each EPA of the curriculum. [Table 3] These should be used routinely as part of the learning process with timely and specific feedback on performance.

### 6.1. Knowledge

Acquisition of knowledge is a prerequisite for training. In addition to continuous acquisition of knowledge during training, attending approved, high-quality educational events and using on-line resources, e.g. those approved by EACCME, are an increasingly useful source of knowledge. Trainees are strongly encouraged to test their knowledge with multiple choice questions (MCQs), related to the chapters of the core curriculum such as those provided on the ESCeL platform. The European Examination in General Cardiology (EEGC) is a tried and tested tool to assess knowledge. It is delivered as a computer-based summative test of a broad range of general cardiology knowledge delivered once each year by



computer in 120 MCQs over 3 hours. It is a joint venture between the ESC and UEMS-CS and is a training requirement in many European countries. Trainees may also be required to take local or national tests of knowledge and may choose to certify in one or more cardiology sub-specialties through the ESC certification programmes.

## 6.2. Skills

Cardiology training requires the acquisition of a wide range of clinical and advanced procedural skills. Trainees must keep a record of their clinical experience in a logbook and undertake frequent workplace-based assessments throughout training to allow them to continually gather evidence of learning and receive formative feedback. These assessments should be kept in a training portfolio and should include case-based discussions (CbD) and mini-clinical evaluation exercises (mini-CEX) focused on learning points with individual patients, with assessment of clinical management, decision making, team working, time management, record keeping and handover over a clinic, ward-round or whole day, assessed using an acute care assessment tool (ACAT). Video assessment and feedback may be used to facilitate discussion and learning. The acquisition of procedural skills should be assessed by direct observation using a summative (DOPS) assessment tool. The trainee should receive immediate feedback to identify strengths and areas for development. Cardiology trainees need to acquire skills in teaching as well as undertaking audits and quality improvement projects. These skills should be assessed by direct observation and discussion using suitable tools (teaching observation, TO); audit assessment tool, AAT; quality improvement project assessment tool, QIPAT).

## 6.3. Attitudes

The development of trainees' attitudes and behaviours can be assessed by reports from multiple trainers (multiple consultant reports, MCR) but it is also important to obtain structured feedback from other members of the multi-disciplinary team. Multi-source feedback (MSF) should be arranged by the trainee's educational supervisor. This can provide valuable insights into generic skills such as communication, leadership, team working and reliability, from more senior and more junior doctors, nurses, administration staff, and other clinical professionals. Feedback must be given by the supervisor to facilitate honest, constructive feedback. Patient surveys (PS) should also be conducted early and towards the end of training to assess patients' perceptions of the trainee's communication skills.

Epstein R.M. and Hundert E.M.  
Defining and Assessing Professional Competence  
*JAMA* 2002 Jan 9;287(2):226-35.



Table 1: Chapters

1	The Cardiologist in the wider context
2	Imaging
3	Coronary artery disease
4	Valvular heart disease
5	Rhythm disorders
6	Heart failure
7	Acute cardiovascular care
8	Prevention, rehabilitation, sports
9	Cardiac patients in other settings

Table 2: Levels of independence

Levels of **Independence for a professional activity**

<p><b>Level 1:</b> Trainee is able to <b>observe</b></p>
<p><b>Level 2:</b> Trainee is able to <b>perform the activity under direct supervision</b> proactive, close supervision, supervisor in the room</p>
<p><b>Level 3:</b> Trainee is able to <b>perform the activity under indirect supervision</b> reactive, on-demand supervision, trainee has to ask for help, supervisor readily available, within minutes</p>
<p><b>Level 4:</b> Trainee is able to <b>perform the activity under distant supervision</b> reactive supervision available remotely, e.g. within 20-30min, on the phone or post-hoc</p>
<p><b>Level 5:</b> Trainee is able to <b>supervise others</b> in performing the activity</p>

**Table 3: EPAS - Levels of independence**

1. Observe
2. Direct supervision
3. Indirect supervision
4. Distant supervision
5. Able to teach (no supervision)

EPA	Level of independence				
	1	2	3	4	5
<b>2. Imaging</b>					
2.1. Assess a patient using one or multiple imaging modalities					
2.2. Assess a patient using echocardiography					
2.3. Assess a patient using cardiac magnetic resonance					
2.4. Assess a patient using cardiac computed tomography					
2.5. Assess a patient using nuclear techniques					
<b>3. Coronary artery disease</b>					
3.1. Manage a patient with symptoms suggestive of coronary artery disease					
3.2. Manage a patient with acute coronary syndrome					
3.3. Manage a patient with chronic coronary syndrome					
3.4. Assess a patient using coronary angiography					
<b>4. Valvular heart disease</b>					
4.1. Manage a patient with aortic regurgitation					
4.2. Manage a patient with aortic stenosis					
4.3. Manage a patient with mitral regurgitation					
4.4. Manage a patient with mitral stenosis					
4.5. Manage a patient with tricuspid regurgitation					
4.6. Manage a patient with tricuspid stenosis					
4.7. Manage a patient with pulmonary regurgitation					
4.8. Manage a patient with pulmonary stenosis					
4.9. Manage a patient with multivalvular disease					
4.10. Manage a patient with a prosthetic valve					
4.11. Manage a patient with endocarditis					
<b>5. Rhythm disorders</b>					
5.1. Manage a patient with palpitations					
5.2. Manage a patient with transient loss of consciousness					
5.3. Manage a patient with atrial fibrillation					
5.4. Manage a patient with atrial flutter					
5.5. Manage a patient with supraventricular tachycardia					
5.6. Manage a patient with ventricular arrhythmia					
5.7. Manage a patient with bradycardia					
5.8. Manage a patient with a cardiac ion channel dysfunction					
5.9. Manage a patient with a pacemaker					
5.10. Manage a patient with an ICD					
5.11. Manage a patient with a CRT device					

**Table 3: EPAS - Levels of independence - continuation**

1. Observe
2. Direct supervision
3. Indirect supervision
4. Distant supervision
5. Able to teach (no supervision)

EPA	Level of independence				
	1	2	3	4	5
<b>6. Heart failure</b>					
6.1. Manage a patient with symptoms and signs of heart failure					
6.2. Manage a patient with heart failure with reduced ejection fraction					
6.3. Manage a patient with heart failure with preserved ejection fraction					
6.4. Manage a patient with acute heart failure					
6.5. Manage a patient with cardiomyopathy					
6.6. Manage a patient with pericardial disease					
6.7. Manage a patient with right heart dysfunction					
6.8. Manage a patient with a cardiac tumor					
6.9. Manage cardiac dysfunction in oncology patients					
<b>7. Acute cardiovascular care</b>					
7.1. Manage a patient with haemodynamic instability					
7.2. Manage a patient with survived cardiac arrest					
7.3. Manage a critically ill cardiac patient					
7.4. Manage a patient after a percutaneous cardiovascular procedure					
7.5. Manage a patient after cardiac surgery					
7.6. Manage end-of-life care in a cardiac patient					
<b>8. Prevention, rehabilitation, sports</b>					
8.1. Manage cardiovascular aspects in an athlete (Sport Cardiology)					
8.2. Manage a patient with arterial hypertension					
8.3. Manage a patient with dyslipidaemia					
8.4. Manage cardiovascular aspects in a diabetic patient					
8.5. Manage a cardiac patient in primary prevention					
8.6. Manage a cardiac patient in secondary prevention					
8.7. Prescribe a prevention and rehabilitation programme for a cardiovascular patient					
<b>9. Cardiac patients in other settings</b>					
9.1. Manage a patient with aortic disease					
9.2. Manage a patient with trauma to the aorta or the heart					
9.3. Manage a patient with peripheral artery disease					
9.4. Manage a patient with thromboembolic venous disease					
9.5. Manage a patient with pulmonary thromboembolism					
9.6. Manage a patient with pulmonary hypertension					
9.7. Manage a patient with adult congenital heart disease					
9.8. Manage a pregnant patient with cardiac symptoms or disease					
9.9. Perform a cardiological consultation					

**Table 4: Investigations - Levels of independence**

1. Observe
2. Direct supervision
3. Indirect supervision
4. Distant supervision
5. Able to teach (no supervision)

Investigations	Levels of independence				
	1	2	3	4	5
ECG					
AMBULATORY ECG					
EXERCISE ECG TESTING					
CARDIOPULMONARY EXERCISE TESTING					
AMBULATORY BP MONITORING					
TRANSTHORACIC ECHOCARDIOGRAPHY					
TRANSESOPHAGEAL ECHOCARDIOGRAPHY					
STRESS ECHOCARDIOGRAPHY					
VASCULAR ULTRASOUND					
CORONARY CT					
CARDIAC CT					
CARDIAC MR					
NUCLEAR IMAGING					
RIGHT HEART CATHETERISATION					
ENDOMYOCARDIAL BIOPSY					
CORONARY ANGIOGRAPHY					
PERCUTANEOUS INTERVENTIONS					
STRUCTURAL INTERVENTIONS					
CARDIAC SURGERY					
PACEMAKER PROGRAMMING					
ICD/CRT PROGRAMMING					
TEMPORARY PACEMAKER IMPLANTATION					
PERMANENT PACEMAKER IMPLANTATION					
ICD/CRT IMPLANTATION					
ELECTROPHYSIOLOGICAL STUDIES					
ELECTROPHYSIOLOGICAL INTERVENTIONS					
ELECTRICAL CARDIOVERSION					
PERICARDIOCENTESIS					

Figure 3: Assessment

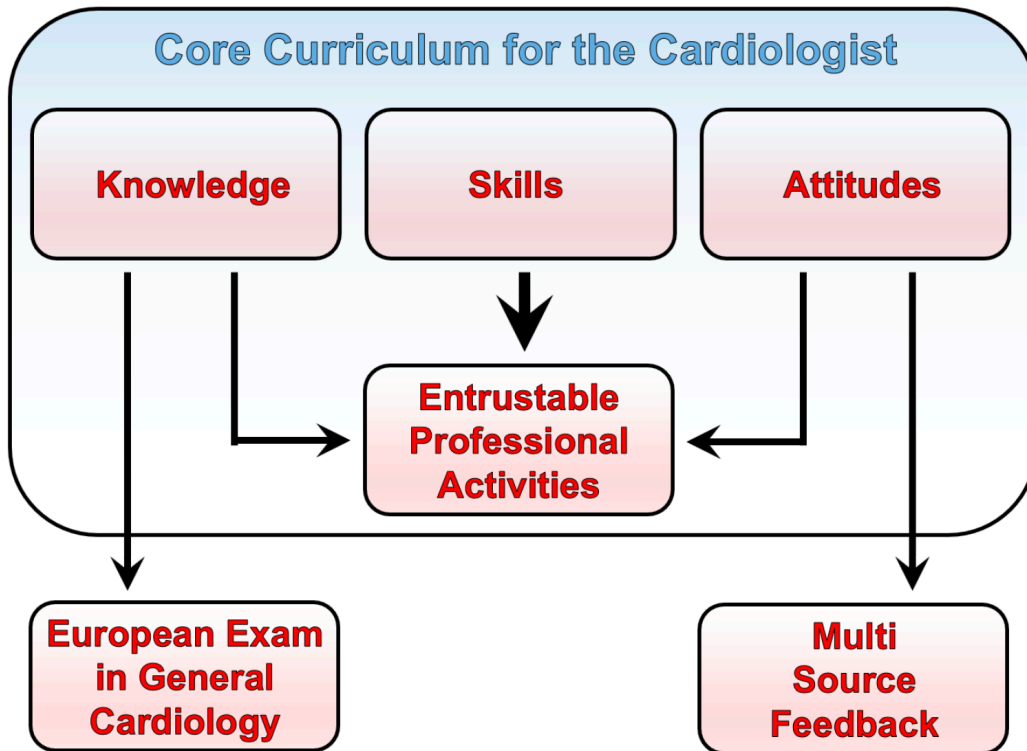


Figure 4: Interaction

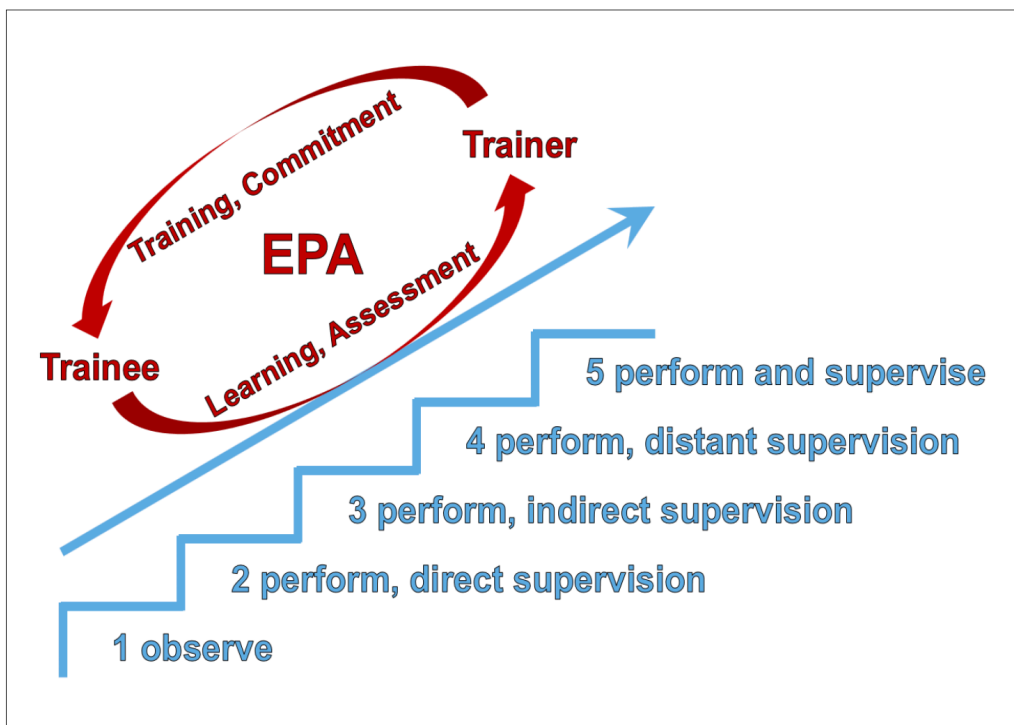


Figure 5: Training

